“Movement of the sacroiliac joint during the active straight leg raise test in patients with long-lasting severe sacroiliac joint pain”

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published in
Clinical Biomechanics
2018

DOI (link to publisher)
10.1016/j.clinbiomech.2018.01.008

document version
Publisher's PDF, also known as Version of record

Clinical Biomechanics 52 (2018) 100–101

Contents lists available at ScienceDirect

Clinical Biomechanics

journal homepage: www.elsevier.com/locate/clinbiomech

Letter to the Editor

"Movement of the sacroiliac joint during the active straight leg raise test in patients with long-lasting severe sacroiliac joint pain"—A letter to the editor

ARTICLE INFO

Keywords:
Active straight leg raise
Pelvic girdle pain
Sacroiliac joints
Pubic symphysis

Dear Editor of Clinical Biomechanics,

We read with interest Kibsgård et al.'s above Clinical Biomechanics paper. Radiostereometric Analysis was performed to measure sacroiliac movements during the Active Straight Leg Raise (ASLR) in 12 patients with chronic Pelvic Girdle Pain (PGP). Of the patients, 8 had been diagnosed with bilateral, and 4 with unilateral sacroiliac pain. All were about to undergo sacroiliac fusion surgery.

We fully agree with Kibsgård et al. that this is an important field. About 5% of all pregnant women suffer from PGP that is sufficiently serious to warrant medical attention (Wu et al., 2004). Also athletes with groin pain may have PGP (Verrall et al., 2001), often in the form of osteitis pubis. Both groups of patients have difficulties performing the ASLR (Mens et al., 2006).

Contralateral to the side of the raising leg, Kibsgård et al. observed 0.8° backward rotation of the ilium with respect to the sacrum (range −0.3° to −1.3°, 'minus' for backward), and ipsilaterally on average 0.0° (range −1.0° to +0.5°). We congratulate Kibsgård et al. with this contribution to the field. Still, there are some questions.

In attempting to understand the causes of the observed movements, Kibsgård et al. invoke our earlier ASLR study, Hu et al. (2012), with healthy subjects, where we reasoned that hip flexion exerts a forward pull on the ipsilateral ilium, which may be counteracted by contralateral extensor activity. This may only work "*if the two sides of the pelvis act as a single unit, such as when they are pressed together by force closure*" (Hu et al., 2012, p. 534; cf. Snijders et al., 1983). But Kibsgård et al.'s contralateral sacroiliac movement revealed that force closure, if any, was not, or not completely successful. Perhaps, failing force closure differentiates PGP from healthy subjects, but presently, we cannot know this, since Hu et al. (2012), did not measure sacroiliac movements, and Kibsgård et al. (2017), did not use healthy controls.

And how is the ipsilateral ilium kept together with the sacrum? Kibsgård et al. invoke ipsilateral-only stabilizing mechanisms, but until now, such mechanisms remain unknown. Kibsgård et al. remark that the ilium may already be in maximum anterior rotation when the subject is in supine position (Sturesson et al., 1989), which would not allow any further forward rotation. Still, to understand what happens, we need to know the initial position, and the movement, if any, of both ilia and the sacrum, and not just the relative movement of the ilium with respect to the sacrum.

Mens et al. (1999), reported 1–5 mm vertical movements ("steps") between the pubic bones, with the ipsilateral pubis lower than the contralateral one. They explained this as a forward rotation of the ipsilateral ilium (cf. Sturesson et al., 1989). Kibsgård et al. state that they "contradict" (p. 44) this interpretation, which difference of opinion, they argue, may be "due to different methodology", their own measurements being "more reliable and valid" (p. 43). But we see no role of methodology here.

Mens et al. did not measure sacroiliac movements, but inferred them from symphyseal steps, whereas Kibsgård et al. did not measure symphyseal steps, but found sacroiliac movements that may affect these steps. Assuming rigidity of the pelvic bones (but see Haussler et al., 2009), we performed a quick and dirty calculation, which revealed that a 0.8° backward rotation of the contralateral ilium implies in the order of 2 mm stepping upward of the pubis, which, ballpark, agrees with Mens et al. Any asymmetry of sacroiliac sagittal plane movements will lead to symphyseal steps.

Comparing painful and pain free joints, Kibsgård et al. found significantly larger rotations around the helical axes of the painful joints, 0.8°, than in the pain free joints, 0.4°. Thus, more movement may coincide with more pain. In terms of cartesian rotation with respect to the sacrum, however, the authors did not find any systematic differences, as if there is no relationship between sacroiliac movement and pain. Are we missing something important here, such as, perhaps, pain upon sacroiliac compression (Szadek et al., 2010)? We wonder if there was any relationship at all between individual ASLR scores and sacroiliac movements (helical/cartesian; ipsilateral/contralateral). Was there more pain in subjects with more forward rotation of the ipsilateral ilium?

Further understanding of ASLR problems in PGP remains an important priority. The next step in research should include full analyses of muscle activity, pelvic kinematics, the patients' problems, and the relationships between these variables.

☆ Support from the National Natural Science Foundation is acknowledged by H. Hu (#31270996) and W.-H. Wu (#81272161).

https://doi.org/10.1016/j.clinbiomech.2018.01.008
Received 6 September 2017; Accepted 14 January 2018

We need to better understand the Active Straight Leg Raise

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